

II. Claims Rejected Under 35 U.S.C. § 103(a)

Claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,786,915 issued to Scobey (hereinafter "Scobey") in view of U.S. Patent No. 4,377,324 issued to Durand et al. (hereinafter "Durand").

In order to establish a *prima facie* case of obviousness, the Examiner must show that the cited references teach or suggest each of the elements of the claims. In regard to claim 1, neither Scobey nor Durand teach or suggest an actuator that utilizes an electrostatic force as a driving force along with a lever mechanism actuating a displacement and improving a tolerance of the air gap between the fixed mirror and the removable mirror. The Examiner admits that Scobey does not teach or suggest a mirror including an air gap disposed between a fixed mirror and removable mirror or an actuator for "reciprocating the movable mirror for changing the width of the air gap." Durand does not teach a detailed method for controlling the air gap. Controlling an air gap in a device such as that claimed in claim 1 involves complicated and intricate techniques. Small changes while controlling the air gap can have a great effect. Claim 1 includes controlling the air gap by using an actuator wherein the actuator utilizes an electrostatic force. For example, in one embodiment of the invention, the actuator utilizes an electrostatic force between the fixed electrode 316 and a moving electrode 317 or 319 as the driving force and restoring force which is generated by elastic member 318. See page 11, lines 5-8. The fixed mirror is locked on the silicon circuit and a comb actuator 321 is moved by the electrostatic force. A nano displacement is generated by passing a micro displacement of the comb actuator through the link level 412 which is the displacement reduction lever. See Figures 3 and 4. The movable mirror is moved and controlled by the nano displacement. The controlling method claimed in claim 1 can improve the tolerance of a system on the scale of a nanometer.

This method of controlling the position and gap associated with the silicon plates would not be obvious to one of ordinary skill in the art in light of the cited references. These plates have a size of $100\mu\text{m} \times 100\mu\text{m}$ and a thickness of $0.1 \sim 2\mu\text{m}$. The performance of a filter will differ depending on the control method used. Durand did not provide a detailed explanation of how an air gap is controlled. Thus, simply combining this reference with Scobey, cannot provide performance equivalent to that provided by the method claimed in claim 1.

Further, it would not have been obvious to one of ordinary skill in the art to combine Scobey with Durand. The two cited patents teach components with discrete functionalities and structures that differ significantly from the structures claimed in the claim 1. Claim 1 states a method which inherently includes an extremely precise method for controlling the air gap. The mirrors taught by Scobey are produced by depositing dielectric materials and are not equivalent to mirrors produced by scabbling silicon. Thus, Scobey cannot be combined with Durand to teach a method for controlling an air gap as claimed in claim 1. Therefore, Scobey combined with Durand does not teach each element of claim 1. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 1 are requested

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Scobey and Durand and further in view of U.S. Patent No. 4,751,509 issued to Kubota et al (hereinafter "Kubota") and U.S. Patent No. 6,160,834 issued to Scott (hereinafter "Scott").

Claim 2 depends from independent claim 1 and incorporates the limitations thereof. Thus, for the reasons mentioned in regard to claim 1, neither Scobey nor Durand teach or suggest each of the elements of claim 2. Further, Kubota and Scott do not cure the defects of Scobey and Durand. The Examiner has not identified any part of Kubota or Scott that teaches the actuator or air gap as claimed in claim 1.

Applicants note that the silicon used for the erecting plates of Scott is produced by a different method and serves a different function than the claimed plates. Scott teaches erecting plates that are formed by alternately depositing a silicon nitride having a high refractive index and siliconoxide having a low refractive index to produce a distributed Bragg reflector. Scott does not teach plates produced by vertically etching silicon. The mirrors as claimed in claim 2, include erecting plates as part of a passive optical device. The mirror including the etching plates of Scott is part of a vertical cavity surface emitting laser which is an active device. Thus, it would be inappropriate to equate the erecting plates of Scott to the erecting plates claimed in claim 2.

The meaning of the term "thickness" in claim 2 is used differently from the manner in which this term is used in Kubota. Kubota uses the term "thickness" as a description of depth (i.e., the difference between a lower part and upper part). The equation $(2m+1) \lambda / 4$ is related to the thickness of the erecting plate for operating the filter as a transmission filter in claim 2. However, in Kubota, this equation is related to a reflective diffraction grating. A device claimed in claim 2 will allow incident light to pass orderly through the erecting plate, however, the device taught by Kubota teaches incident light being diffracted and reflected at the erecting plate. Therefore, the cited references do not teach each of the elements of claim 2. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 2 are requested.

Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Scobey and Durand and further in view of U.S. Patent No. 6,212,292 issued to Soares (hereinafter "Soares").

Claim 3 depends from independent claim 1 and incorporates the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 1, Scobey and Durand do not teach each of the elements of claim 3. Soares does not cure the defects of Scobey and Durand. The Examiner does not indicate any part of Soares that teaches the air gap and actuator as claimed in claim 1. Further, claim 3 includes the element of an oxide layer functioning as a sacrificial layer. Soares does not teach this element of claim 3. Rather, Soares teaches an outside layer used for

protecting a surface after completion to produce a sensor element. Therefore, the cited references do not teach each of the elements of claim 3. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 3 are requested.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Scobey and Durand and further in view of U.S. Patent No. 5,990,769 issued to Tam (hereinafter "Tam").

Claim 4 depends from independent claim 1 and incorporates the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 1, Scobey and Durand do not teach each of the elements of claim 4. Tam does not cure the defects of Scobey and Durand. The Examiner has not indicated any part of Tam that teaches or suggests an air gap or an actuator as claimed in claim 1.

Further, Tam does not teach an actuator as claimed in claim 4. Rather, Tam teaches an electric outlet adapter. This adapter has a significantly different construction from the actuator claimed in claim 4. Applicants note that Tam uses an electromagnet for operating power and does not teach the use of electrostatic for operating power. One embodiment of the present invention, the movable part is made electrically conductive by highly doping the silicon layer. The movable part is composed of a movable comb electrode and a second electrode component which is locked into the substrate. However, Tam teaches metal being used for the movable parts. Reconsideration and withdrawal of the obviousness rejection of claim 4 are requested.

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Scobey, Durand, and Tam in further view of U.S. Patent No. 4,887,109 issued to Fujita, et al. (hereinafter "Fujita").

Claim 5 depends from dependent claim 4 and incorporates the limitations thereof. Thus, for the reasons mentioned in regard to claim 4, Scobey, Durand and Tam do not teach each of the elements of claim 5. Fujita does not cure the defects of Scobey, Durand and Tam. The Examiner has not indicated any part of Fujita that teaches or suggests an air gap or an actuator as claimed in claim 1.

Further, Applicants note Tam teaches a leaf spring that is used as a cantilever and does not teach a thin spring having clamped boundary at both ends. Fujita does not teach a link lever that attenuates the movement of the actuator at a certain rate by controlling the location of the link lever from the anchor in relation to the anchor passing this on to the movable mirror. The cited references do not teach each of the elements of claim 5. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 5 are requested.

Claims 6 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Scobey in view of Durand. These claims include many of the elements of independent claim 1. Thus, for the reasons mentioned in regard to claim 1, Scobey and Durand do not teach each of the elements of claims 6 and 7. Specifically, Scobey and Durand do not teach an air gap or actuator as claimed in claims 6 and 7. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 6 and 7 are requested.

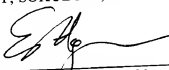
CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely claims 1-7 patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207 3800.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 8/22/02


Eric S. Hyman, Reg. No. 30,139

CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Box Non-Fee Amendment, Assistant Commissioner for Patents, Washington, D.C. 20231, on August 22, 2002.


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8-22-02
August 22, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the claims as follows:

1. (Amended) An optical tunable filters comprising:

a fixed mirror including a number of first erecting plates;

a movable mirror including a number of second erecting plates;

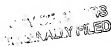
an air gap disposed between the fixed mirror and the movable mirror; and

an actuator reciprocating the movable mirror for changing the width of the air gap[.],

wherein the actuator utilizes an electrostatic force as driving force and lever mechanism for

accurating displacement and improving a tolerance of the air gap between the fixed mirror and the

movable mirror.



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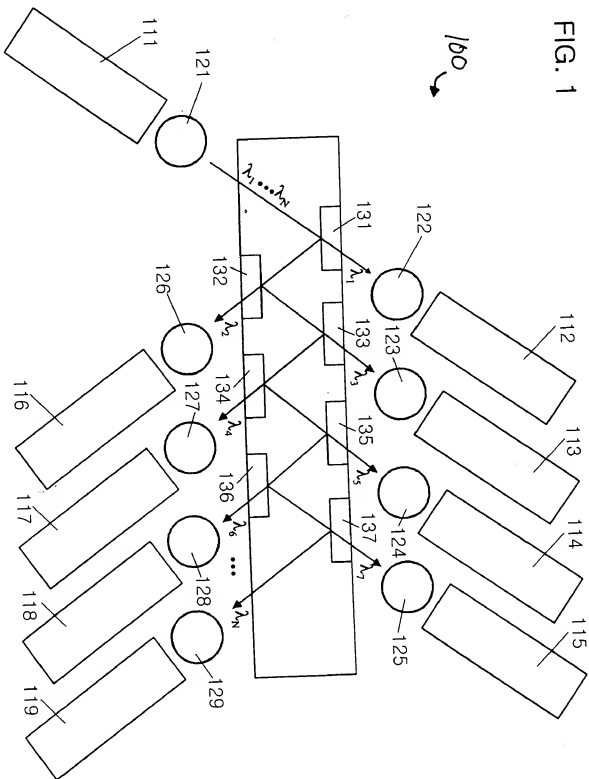
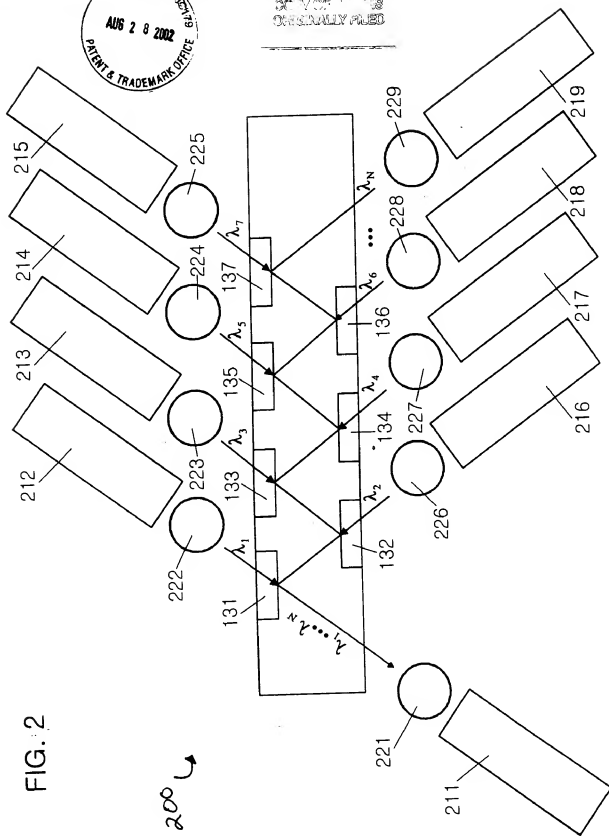


FIG. 2



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FIG. 3A

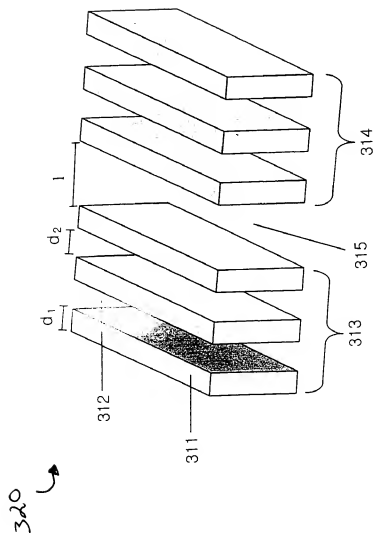


FIG. 4

300

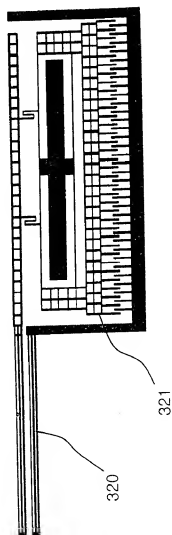
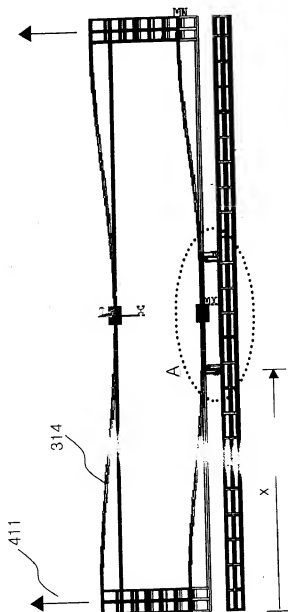


FIG. 5



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